

SocketModem[®] Cell GPRS SocketModem[®] iCell GPRS

MTSMC-G2 Device Guide

SocketModem Cell GPRS and SocketModem iCell GPRS G2 Device Guide

S000529, Version A

MTSMC-G2, MTSMC-G2-V, MTSMC-G2-IP, MTSMC-G2-GP

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Revisions

Revision	Date	Description
A	12/05/12	Initial release. Information was part of the Universal Socket Developer Guide.

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The Knowledge Base provides immediate access to support information and resolutions for all Multi-Tech products. Visit <http://www.multitech.com/kb.go>.

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Warranty

To read the warranty statement for your product, please visit: <http://www.multitech.com/warranty.go>.

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Chapter 1 – Device Overview

Description

SocketModem Cell and iCell GPRS models are complete ready-to-integrate communication devices that offer standards-based quad-band GSM/GPRS Class 10 performance. These quick-to-market communications devices allow developers to add wireless communication and GPS tracking to products with a minimum of development time and expense. Both models are based on industry-standard open interfaces and use Multi-Tech's Universal Socket design. The SocketModem iCell features the intelligence of the embedded Universal IP stack, which allows for automatic/persistent connectivity for mission critical applications and enhanced M2M functionality.

Product Build Options

Product	Description	Region
MTSMC-G2	Quad-band SocketModem Cell GPRS	US Default
MTSMC-G2-ED	Quad-band SocketModem Cell GPRS	EU Default
MTSMC-G2-V	Quad-band SocketModem Cell GPRS with Voice	US Default
MTSMC-G2-V-ED	Quad-band SocketModem Cell GPRS with Voice	EU Default
MTSMC-G2-IP	Quad-band SocketModem iCell GPRS with Universal IP	US Default
MTSMC-G2-IP-ED	Quad-band SocketModem iCell GPRS with Universal IP	EU Default
MTSMC-G2-GP	Quad-band SocketModem iCell GPRS with GPS and Universal IP	US Default
MTSMC-G2-GP-ED	Quad-band SocketModem iCell GPRS with GPS and Universal IP	EU Default
Developer Kit		
MTSMI-UDK	Universal Developer Kit	Global

Notes:

These units ship without network activation. To connect them to the network, you need a cellular account. For information, refer to Account Activation for Cellular Devices in the Universal Socket Developer Guide.

GP devices have a dedicated GPS receiver.

US Default builds are 850/1900 MHz. European Default, ED, builds are 900/1800 MHz.

Voice builds include microphone and speaker pins.

All builds can be ordered individually or in 50-packs.

The complete product code may end in .Rx, for example MTSMC-G2.Rx, where R is revision and x is the revision number.

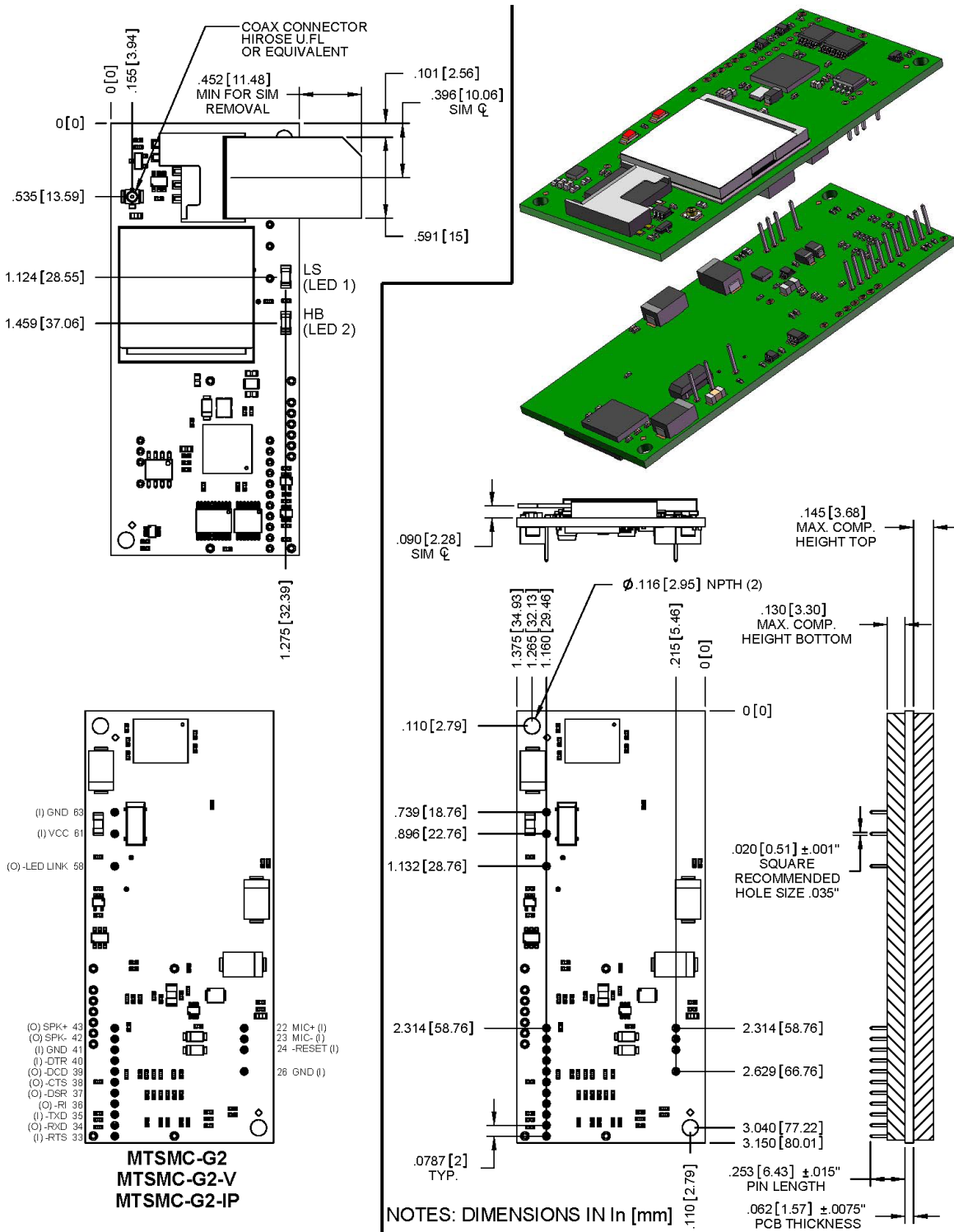
Documentation

The following documentation is available by email to oemsales@multitech.com or by using the Developer Guide Request Form on the multitech.com website.

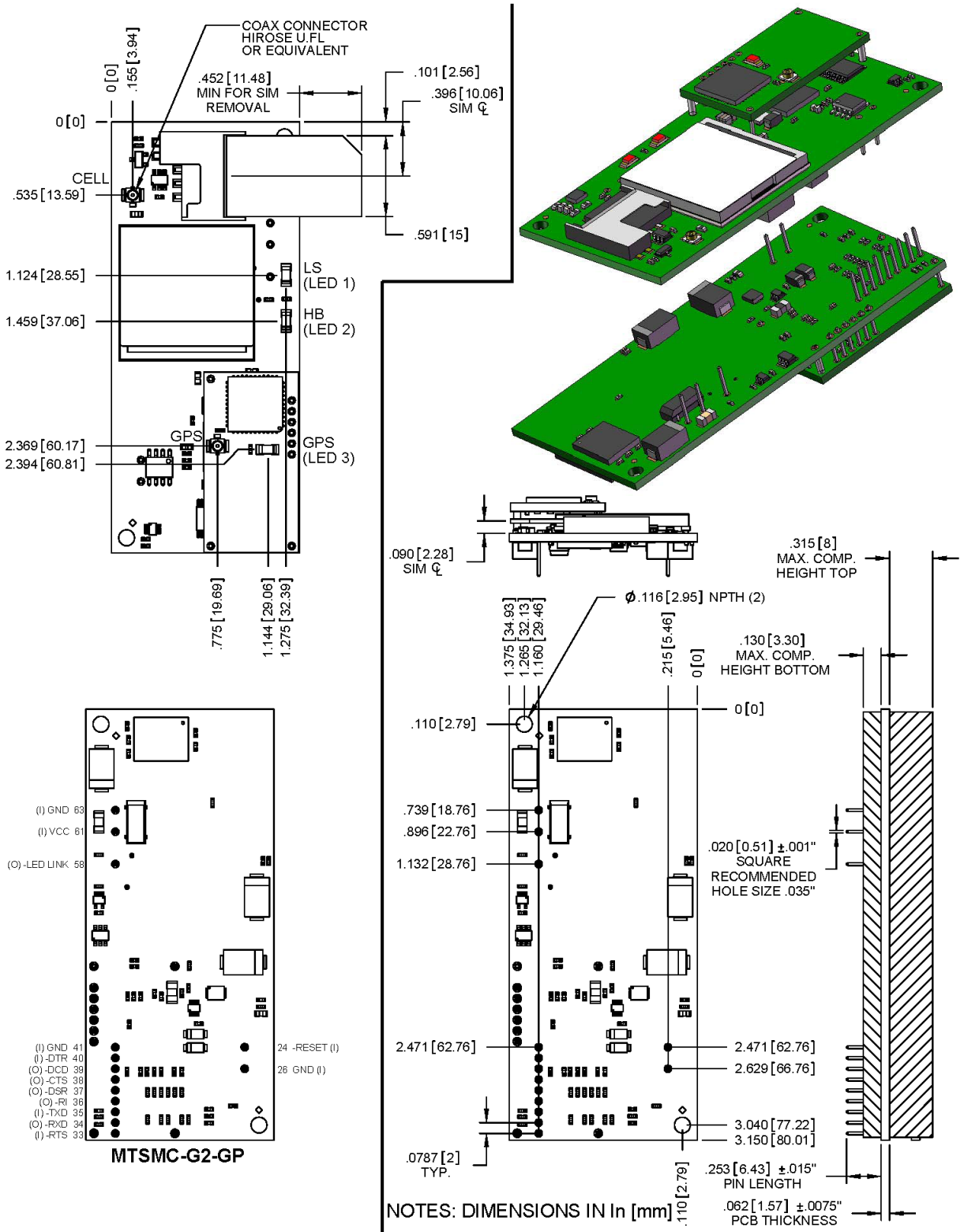
- **Device Guides** – This document. Provides model-specific specifications and developer information.
- **Universal Socket Developer Guide** – Provides an overview, safety and regulatory information, design considerations, schematics, and general device information.
- **AT Command Guide** – Use the following AT Command Guides with GPRS devices:
 - S000463 for G2 Modems
 - S000469 for G2 Modems with IP
 - S000457 Universal IP Commands

Chapter 2 – Mechanical Drawings

MTSMC-G2, MTSMC-G2-V, and MTSMC-G2-IP Builds



MTSMC-G2-GP Build



Chapter 3 – Specifications

Technical Specifications

Category	Description
General	
Standards	GPRS Class 10
Frequency Bands	Quad-band GSM/EGPRS 850/900/1800/1900 MHz
Speed, Format, Compression	
Serial/Data Speed	Serial interface supports DTE speeds up to 921.6Kbps Packet data up to 85.6Kbps Circuit-switched data (GPRS) up to 14.4Kbps transparent and non-transparent
Data Format	10 bit serial asynchronous
Data Error Correction	MNP2
Data Compression	V.42bis
Physical Description	
Weight	1 oz. (28g)
Dimensions	3.1" L x 1.4"W x 0.5"H (7.8cm x 3.5cm x 1.2cm)
Connectors	
Antenna Connector	Surface mount UFL one cellular, one GPS
SIM Holder	Standard 1.8V and 3V
Environment	
Operating Temperature	-40° C to +85° C
Storage Temperature	-40 °C to +85°C
Humidity	10% to 90%
Power Requirements	
Operating Voltage	Supply Range: VCC Maximum: 5.5
Voltage at Any Signal Pin	Minimum: GND Maximum: VCC
Input Power	5VDC
IP, M2M, SMS	
Supported IP Protocols	For MTSMC-G2 and MTSMC-G2-V: FTP, HTTP, POP3, SMTP, TCP client & server, and UDP. For MTSMC-G2-IP and MTSMC-G2-GP: DNS Resolve, FTP Client, Ping, POP3 Client, PPP (dial-out), SMTP Client, TCP RAW client & server, UDP RAW client & server, PAP,CHAP authentication
M2M Applications	MTSMC-G2-IP, MTSMC-G2-GP: Automatic connect/reconnect, device monitor, modem emulation, Ping & TCP keep alive, wake-up on caller ID, wake-up on ring, GPS tracking (GP model only)
SMS	Message length up to 160 characters.

Category	Description
Certifications, Compliance, Warranty	
EMC Compliance	FCC Part 15 EN55022 EN55024
Radio Compliance	FCC Part 22 FCC Part 24 RSS 132 RSS 133 EN 301 511 EN 301 489-1 EN 301 489-7 AS/ACIF S042.1 AS/ACIF S042.3
Safety Compliance	UL 60950-1 cUL 60950-1 IEC 60950-1 AS/NZS 60950-1
Network Compliance	PTCRB
Warranty	Two years

Notes:

Radio performance may be affected by temperature extremes. This is normal. The radio is designed to automatically fallback in class and reduces transmitter power to avoid damage to the radio. When this occurs depends on the interaction of several factors, such as ambient temperature, operating mode, and transmit power.

Mounting Hardware

#4 or M2/M3 hardware should be used for mounting the SocketModem to the board. Refer to the Mechanical Drawings for more information.

Important:

There are traces and vias around the tooling holes, so use nylon hardware if you are using the tooling holes to mount the SocketModems on the board.

Device Reset

The SocketModem is ready to accept commands after a fixed amount of time ("X" Time) after power-on or reset.

Model	Time Constant	"X" Time	Minimum Reset Pulse ¹
MTSMC-G2	250 ms	6 seconds	100us

¹The SocketModem may respond to a shorter reset pulse.

Reset GPRS

Use this signal to force a reset procedure by providing low level during reset of at least 500us. The signal is considered an emergency reset only. A reset procedure is already driven by internal hardware during the power-up sequence. If no external reset is necessary, leave this input open. If using emergency reset, it has to be driven by an open collector or an open drain.

DC Electrical Characteristics

Units: Volts 5V DC Characteristics (VDD = 5V ± 0.25V) VDDMAX = 5.25V

Parameter	Minimum	Maximum
Digital Signal Input Low Level –DTR (40), –TXD (35), –RTS (33)	GND	0.8
Digital Signal Input High Level –DTR (40), –TXD (35), –RTS (33)	2	Vcc
Digital Signal Output Low Level –DCD (39), –CTS (38), –DSR (37), –RI (36), –RXD (34)		0.4
Digital Signal Output High Level –DCD (39), –CTS (38), –DSR (37), –RI (36), –RXD (34)	3.84	
Reset (Low Active) Input Low Level –Reset (24)		0.8
Reset (Low Active) Input High Level –Reset (24)	2	
Digital Input Capacitance	14pF	

Power Measurements

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into your power source when determining product load.

Input Voltage = 5.0 Volts	Sleep Mode	Typical	Maximum ¹	Peak ² TX	Peak Reset
Basic and Voice Builds, MTSMC-G2 and MTSMC-G2-V					
Current (AMPS)	0.015	0.113	0.24	1.40	
Watts	0.074	0.564	1.195		
In-Rush Current (AMPS) (approx. 3ms duration) ³					1.60
IP Build, MTSMC-G2-IP					
Current (AMPS)	0.080	0.135	0.280	1.40	
Watts	0.382	0.664	1.358		
In-Rush Current (AMPS) (approx. 3ms duration)					1.70
GP Build, MTSMC-G2-GP					
Current (AMPS)	0.121	0.225	0.370	1.60	
Watts	0.598	1.11	1.81		
In-Rush Current (AMPS) (approx. 3ms duration)					1.85

¹**Maximum:** The continuous current during maximum data rate with the radio transmitter at maximum power.

²**Peak:** The peak current during a GSM850 transmission burst period.

³**In-Rush Current:** The input current during power up or a reset.

Chapter 4 – FCC and Industry Canada Information

The following is device specific FCC and Industry Canada information. For additional approval and regulatory information, see the Universal Socket Developer Guide.

FCC Grant Parts 22 and 24

FCC Identifier	AU792U09D24824
Equipment Class	PCS Licensed Transmitter
Notes	SocketModem GSM
Modular Type	Single Modular

FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designators
22H	824.2 – 848.8	2.0	0.042 PM	300KGXW
24E	1850.2 – 1909.8	0.98	0.027 PM	300KGXW

PCII filing to allow higher antenna gain.

Output power listed is conducted.

This device contains functions that are not operational in U.S Territories; this filing is only applicable for US Operations.

This device is to be used in mobile or fixed applications only. Antenna gain including cable loss must not exceed as document in this filing, for the purpose of satisfying the requirements of 2.1043 and 2.1091, 22-H, 24-E.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter, except in accordance with FCC multi- transmitter product procedures.

The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.

Industry Canada

Certification Number/No. de Certification	125A-0033
Type of Radio Equipment/Type de Matériel	Cellular Mobile GMS (824-849MHz) PCS Mobile (1850-1910 MHz) Modular Approval
Model/Modele	MTSMC-G2, MTSMC-G2-GP, MTSMC-G2-IP, MTSMC-G2-V
Frequency Range/Bande de Fréquences	824.2-848.8 MHz, 1850.2-1909.8
Emission Designation/Designation D'émission	279KGXW, 271KGXW
RF Power Rating/Puissance Nominale HF	2W Cond., 0.98 W cond.
Antenna/Antenne	Internal PCB Antennas
Specification/Cahier des Charges	RSS-213 Issue 2

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada.

Chapter 5– Application Notes

LED Interface

The LED signal indicates the SocketModem working status.

LED 1 – Link Status – All Builds

LED 1 Signal	Link Status LED	
OFF	Download mode or switched OFF	
ON	Continuously lit	Switched ON (not registered on the network)
	Blinking	Switched ON (registered on the network)

LED 2 – Heartbeat LED –G2-IP and G2-GP Builds Only

LED 2 Signal	Heartbeat LED
OFF	No power to the unit
Blinking	The unit is functioning

LED 3 – GPS Status – GP Builds

LED 3 Signal	GPS Status LED	
OFF	No power to the unit.	
ON	Continuously lit	Satellite not acquired.
	Blinking	Satellite acquired.

RF Performances

RF performances are compliant with the ETSI recommendation 05.05.

Receiver Features

Category	Description
850 GSM Sensitivity	-108 dBm
900 E-GSM Sensitivity	-108 dBm
1800 DCS Sensitivity	-107 dBm
1900 PCS Sensitivity	-107 dBm

Transmitter Features

Category	Description
Maximum output power (GSM/E-GSM)	+33 dBm \pm 2 dB
Maximum output power (DCS/PCS)	+30 dBm \pm 2 dB

RF Connection and Antenna

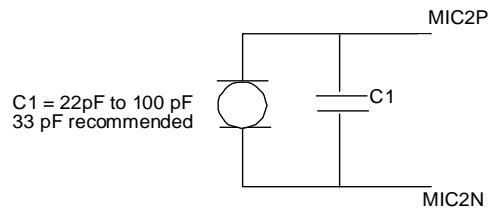
The RF connector on the SocketModem is a UFL standard type. See the Universal Socket Developer Guide for antenna details.

Microphone Inputs

Note: For Voice Build Only.

The MIC inputs are differential ones. They already include the convenient biasing for an electret microphone (0.5 mA and 2 Volts). This electret microphone can be directly connected on these inputs. The impedance of the microphone has to be around 2K. These inputs are the standard ones for a handset design.

The gain of the MIC inputs is internally adjusted. The gain can be tuned from 30dB to 51dB. The connection to the microphone is direct.



Changing the Quad Band

If for any reason, such as moving the modem from one geographical area to another, you want to change the band, you can accomplish this by using the **+WMBS** AT Command.

Changing the GSM Band

To change the GSM band, use a terminal application such as HyperTerminal for entering the AT Command.

1. Start the terminal application.
2. Type **AT+WMBS=<Band><Param>**. Press **Enter**.

For **<Band>**, enter the option you desire:

4 = Dual-band mode 850/1900MHz

5 = Dual-band mode 900/1800MHz

For **<Param>**, enter the option you desire:

0 = Modem must be reset in order to use the specified band(s). This is the default.

1 = Modem restarts immediately using the specified band(s).

Example:

AT+WMBS=4,0. Press Enter.